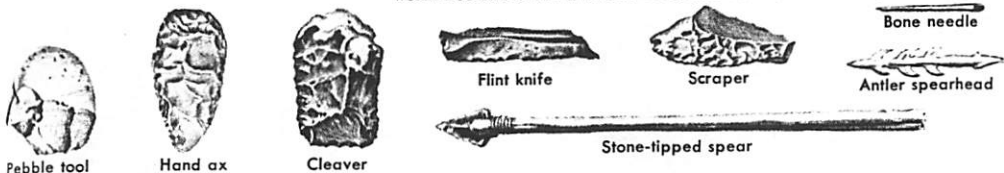




WORLD BOOK illustration by Alton S. Tobey; tools below by Alton S. Tobey and James Teason



Old Stone Age People, also known as **Paleolithic** people, included all human beings who lived before about 8000 B.C. All Paleolithic people lived by hunting. The Neanderthal people, above, are examples of Paleolithic people. They lived in parts of Africa, Asia, and Europe from about 100,000 to 35,000 years ago. The squatting man twirls a stick to start a fire. One woman scrapes a skin, while the other makes a spear shaft. Some tools used by Paleolithic people are shown above.

ago, at a time when the earth had grown cold. Glaciers covered high mountains throughout the world, and ice blanketed all of Antarctica. Only Africa, southeastern Asia, and most of Central and South America remained warm. The first human beings appeared in Africa during this period. See **ICE AGE**.

By about 1½ million years ago, the climate had become so cold in Canada and Scandinavia that more snow fell in winter than could melt in summer. As a result, huge sheets of ice formed in these regions and gradually spread southward. Ice sheets more than 1 mile (1.6 kilometers) thick covered much of Europe, western Asia, and North America by about 800,000 B.C. Between that time and about 8000 B.C., the huge ice sheets retreated and advanced again several times.

The ice sheets grew and spread southward during periods called *glacials*. Each of these periods lasted about 40,000 to 60,000 years. Near the end of each glacial, the earth became warmer, and the southern parts of the ice sheets melted. These warmer periods—called *interglacials*—lasted about 20,000 to 60,000 years.

During the glacial and interglacial periods, early people settled almost all of Africa, southern Asia, and southern Europe, and also part of Australia. Some prehistoric hunters even moved into northern Asia and traveled from Siberia to Alaska. But most prehistoric peoples lived in regions with a warm climate. They settled mainly on grassy plains, close to trees, and near water.

Early people did not know how to keep warm in the cold climate near the ice sheets. They learned how to make fire by about 500,000 B.C. But even after people could make fire, they did not have clothing that would keep them warm in a cold climate. If people at that time wore any clothing, it consisted only of loose, unfitted animal furs and skins, or perhaps some plant materials. As a result, they could not live in much of Asia, Europe, and North America during the glacials.

But the glacials helped prehistoric people by creating regions suitable for settlement. The cold climate of the glacials helped form grasslands where there had once been dense forests in Asia, Europe, and North America. The climate in many dry areas became wetter, changing deserts into grasslands. The grasslands became the home of large herds of antelope, *bison* (buffalo), wild horses, and other animals people could kill for food. After people learned to sew and to make warm clothes, they could live on grasslands almost next to the ice.

The glacials also created land for settlement in another way. Every time the ice sheets grew, they turned large amounts of ocean water into ice. As a result, the level of the sea fell. This lowering of the sea level uncovered new land for settlement. It also created land bridges that connected regions ordinarily separated by water. One of these land bridges linked Siberia with Alaska. Others connected the European mainland with Great Britain, and the Malay Peninsula with the Indo-

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nesian islands. Prehistoric people traveled over these bridges to settle new lands. The ice sheets melted during the interglacials, and sea level rose again, covering the land bridges.

How Prehistoric Hunters Lived

People lived entirely by hunting and by gathering wild plants for almost all of the Stone Age's 2½ million years. The period from the time the first human beings appeared until about 8000 B.C., when the farming way of life began, is called the Old Stone Age or *Paleolithic Period*. Even after some people learned to raise food by farming, many peoples continued to live by hunting. The Stone Age hunters who lived after about 8000 B.C. are called Middle Stone Age, or *Mesolithic*, peoples.

Prehistoric hunters lived in groups and moved from place to place in search of food. A group usually stayed in one place for only a few days. The hunters ate the animals and plants in the area, and then moved on.

Hunters built shelters only if they found enough food in an area to last a few weeks or months. To make a shelter, they probably built a framework of branches, elephant tusks, or young trees, and covered it with leaves, furs, or hides. Scientists have put together this picture of the life of early hunters by studying prehistoric campsites. For example, some sites include the remains of garbage heaps. The amount of garbage indicates people lived in the sites for several months. Some sites include rings of stones and bones that mark the outline of frame shelters or tents.

In a few regions of the world, some prehistoric hunters lived in caves. But most caves were probably too dark and damp for early people to be comfortable in them. As a result, prehistoric people probably occupied caves only during the coldest and stormiest times of the year. See CAVE DWELLERS.

Food. Hunters killed wild animals and gathered wild plants for food. At first, early people hunted mostly small animals, including birds and small reptiles. By about 1,500,000 B.C., hunters had developed the methods and weapons needed to kill or capture larger game. They then hunted such large animals as bison, deer, giant cave bears, and prehistoric elephants.

But bison, elephants, and many other large animals had disappeared from Asia and Europe by about 8000 B.C.—the end of the Paleolithic Period. As a result, Mesolithic peoples who lived afterward on those continents hunted mostly such animals as boars, deer, and wild cattle. Mesolithic peoples who lived near lakes, rivers, or the sea ate chiefly fish and shellfish.

Prehistoric hunters probably cooked some of their food. Before they knew how to make fire, they took burning wood from fires that had started naturally. People learned how to make fire by about 500,000 B.C.

Early people ate not only the meat of an animal but also the soft substance called *marrow* inside the bones. Some partly burnt animal bones from prehistoric sites show that the people apparently sucked out the marrow after cooking the bones. Other bones had been split so that the marrow could be removed and eaten.

Prehistoric hunters also collected wild plants for food. Few fossils of vegetables have been found in prehistoric campsites because plants decay rapidly after they die.

But scientists have found remains of some fruits, nuts, roots, and other types of wild vegetables apparently gathered for food. For example, one site dating from about 400,000 B.C. contained remains of berries.

Clothing. No one knows when people first wore clothing, because scientists have found almost no traces of clothing from the Stone Age. But the prehistoric hunters who lived in cool climates probably wore unfitted body coverings made of animal furs and hides and plant materials. Early people probably began to sew primitive clothes about 15,000 B.C.

Tools. Prehistoric hunters made most of their tools of stone. They also used tools made of bone and wood. But few of these objects have lasted from prehistoric times because bone and wood decay. As a result, scientists get much of their information about prehistoric human beings from stone tools.

Early people's tools were sharp, jagged-edged rocks used for cutting, scraping, and chopping. Hunters used them mainly to butcher animals they killed and to process animal hides. Early people made a tool by striking a small rock with another rock, or with a piece of hard bone or wood. They chipped away pieces of the tool to give it a sharp edge.

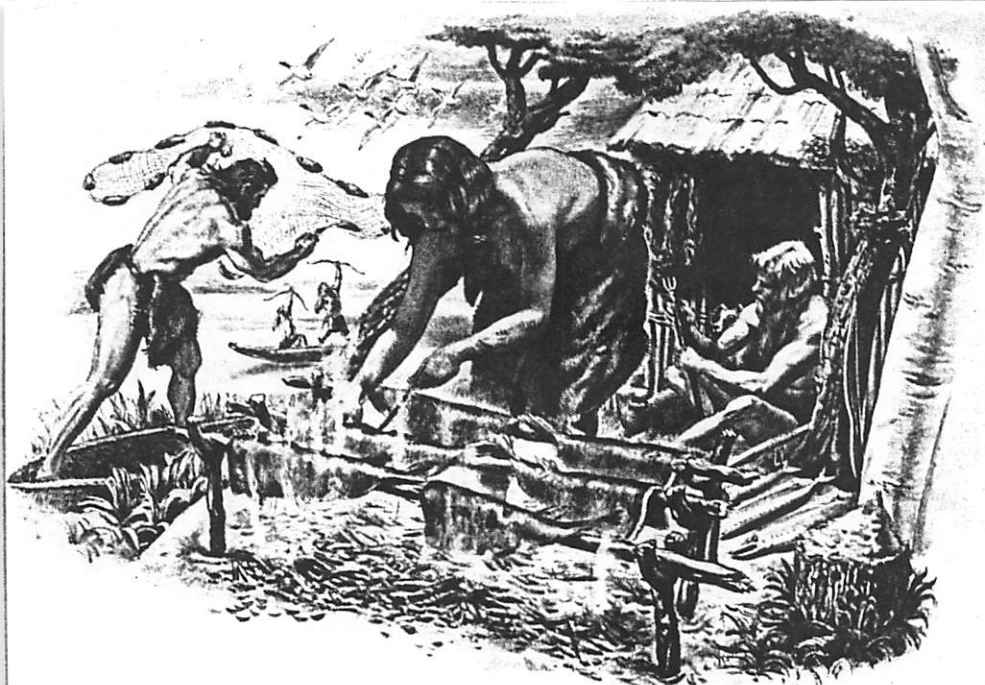
Prehistoric people's first stone tools, called *pebble tools*, were small stones with a sharpened edge on one side. Pebble tools probably served as cutters and scrapers. They may have been the only stone tools until about 1,500,000 B.C.

New kinds of tools appeared after 1,500,000 B.C. People in parts of eastern Asia and eastern Europe began to make two kinds of tools called *chopping tools* and *choppers*. At the same time, people in western Europe, most of Africa, and parts of western Asia began to make *hand axes*. Chopping tools consisted of small, flat rocks sharpened on both sides of the edge. Choppers were longer rocks sharpened on only one side of the edge. Hand axes resembled choppers but had flatter surfaces as a result of additional shaping by the toolmaker. None of these tools had handles.

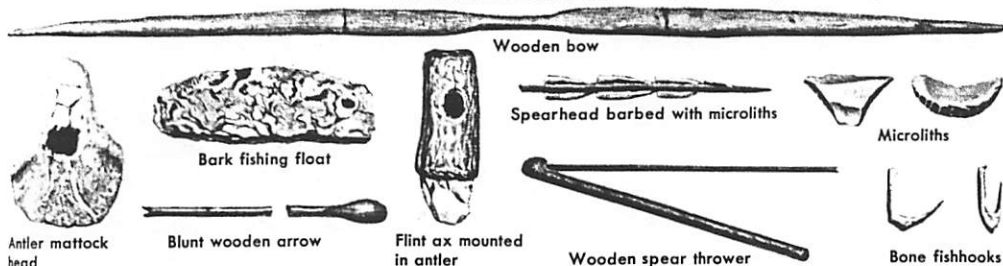
After about 100,000 B.C., most groups of people began making special tools for such different tasks as cutting, chopping, and scraping. Most toolmakers used chips called *flakes* they struck from stones to make *flake tools*. The flakes had sharp edges, and so it required less work to make flake tools than to make other kinds.

Later in the Paleolithic Period, after about 40,000 B.C., many people shaped long, thin *blades* of stone. They used these blades as tools, and they also made blades into knives and spearpoints. After about 15,000 B.C., some groups made much smaller blades called *microliths*. The microliths served as points or cutting edges on wooden arrows, sickles, spears, and other tools and weapons.

Weapons. Throughout most of the Paleolithic Period, few stone tools were used as weapons. People hunted and defended themselves chiefly with rocks, wooden clubs, and sharp-pointed bones and wooden spears. By about 15,000 B.C., people invented the bow and arrow and the *spear thrower*, a kind of launching track that helped a hunter throw a spear with increased range, force, and accuracy. The spear thrower was a long, straight stick with a groove extending from end to end.



WORLD BOOK illustration by Alton S. Tobey; tools below by Alton S. Tobey and James Teason



Middle Stone Age People, also known as **Mesolithic people**, were prehistoric peoples who continued to live by hunting and fishing after others had adopted a farming way of life. Although some Mesolithic peoples did a little farming, they depended on hunting for most of their food. The woman above smokes fish to preserve them. The seated man shapes a fishing spear. The tools and weapons above were used by Mesolithic peoples. Most were also used near the end of the Old Stone Age.

A hook or notch blocked one end of the groove. To use this device, hunters placed a spear in the groove with its unsharpened end against the hook or notch. They then probably held the stick as they would a spear, and thrust it forward to launch the spear.

About the same time people invented the spear thrower, they also invented bone fishhooks and bone harpoons. Prehistoric hunters also made a variety of stone tips to use on arrows as well as spears.

Group Life. Scientists believe that most prehistoric hunters lived in groups of 25 to 50 persons. Each group was made up of several families.

Stone Age hunting groups performed a variety of jobs, from toolmaking to butchering an animal. Tools and animal fossils found in their camps indicate they worked on different jobs in different parts of the camp. For instance, some sites in the camps contain many stone flakes and unfinished tools. These sites were probably

places where the people made their tools. Other sites contain no stone flakes and few tools, but many bones from large animals. In these places, hunters probably butchered large animals. At still other sites, tools and animal bones lie near the remains of shelters and campfires. The people probably ate and slept in these areas.

Bands of about 4 to 30 persons from a group hunted for food. When hunting elephants and other large animals, these bands often set fires to help capture or kill the animals. The fires drove the animals over cliffs or into swamps, pits, snares, or other traps. The bands also gathered a variety of plants that could be eaten.

Prehistoric hunters had much more living space than do people today. Scientists estimate that only a few thousand people lived in all of Africa, and a similar number in Asia, during early prehistoric times. Although a group moved from place to place, it probably stayed within familiar territory and seldom met another

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group. During a lifetime, a person might never see anyone except the 25 to 50 persons in his or her group.

Religion and Art. The oldest known evidence of prehistoric religious life dates from about 60,000 B.C. This evidence includes graves in which early people buried their dead. The graves may mean that early people had begun to believe in life after death. About the same time, some people also buried cave bears, probably as part of a magical or religious practice.

The earliest artistic engravings—carved into bone—date from about 35,000 B.C. Prehistoric peoples developed several forms of art. They painted on rock, modeled in clay, and engraved antlers, bone, and ivory.

Early artists painted with four basic colors. They obtained black from charcoal and ground-up manganese ore; white from clay and lime mud; and red and yellow from animal blood, red clay, and ground-up iron compounds. They mixed the colors in animal fats or blood and produced a paste-like paint. The artists either rubbed this paste onto a rock surface or blew it onto the surface through a hollow bone.

Animals are the most common subject of prehistoric paintings, but the early artists also painted people. Some cave paintings show animals pierced by arrows or spears. Other paintings show human figures standing next to animals that have been killed. The figures wear what seem to be magical costumes. Most of these paintings have been found on walls and ceilings deep inside caves. Early people could have seen them only by firelight. Scientists believe hunters used such paintings in ceremonial rites. Such rites were probably performed to help them in hunting the animals pictured.

Much of the cave art is of excellent quality. The artists may well have been full-time specialists who did not need to hunt. A color photograph of a prehistoric cave painting, in a chamber of Lascaux Cave in France, appears in the **PAINTING** article. Another early cave painting appears in the **HORSE** article.

Prehistoric art from the period after 30,000 B.C. includes some clay figures of women. Early peoples probably believed that such figures helped women in bearing children. Some fossil bones from this same period have sets of orderly scratches on them. A few scholars think these scratches indicate that prehistoric people used a counting system, or that they may even have developed a calendar.

How Prehistoric Farmers Lived

The earliest evidence of farming dates from about 9000 B.C. But many years passed before people began to depend on farming for most of their food. As a result, most experts date the beginning of the farming way of life at about 8000 B.C. Prehistoric farmers, who lived from about 8000 B.C. to 3000 B.C., are called New Stone Age, or *Neolithic*, people. They lived at the same time as the hunters called Mesolithic people.

The development of farming led to some of the most important steps in building civilization. After about 2½ million years as hunters, people no longer had to roam from place to place in search of food. Farmers settled in one area for several years at a time and built villages. They produced so much food that many people were freed from the jobs of farming and hunting. These peo-

ple developed new skills. Some became craftworkers, others became merchants. In time, some farming villages grew to become the first cities. And these cities were the birthplaces of civilization.

The First Steps to Farming were taken when hunters began to understand more and more about the plants and animals they used for food. They probably found out that plants grow from seeds after noticing that plants appeared where seeds had fallen on the ground. Hunters probably learned how to raise animals by making pets of young animals whose mothers they had killed.

About 9000 B.C., people began to collect and to plant seeds from the most useful plants. They also had learned how to raise herds of certain tame and useful animals. These early planters and herders could then depend on a steady supply of food from their crops and livestock. This process of developing plants and animals that grow well out of the wild is called *domestication*. The first domestication took several thousand years.

Scientists believe that the domestication of plants and animals occurred earlier in areas of the Middle East than elsewhere in the world. These areas—which included parts of what are now Iraq, Israel, and Turkey—had enough wild plants and animals to provide food for large numbers of hunters. Because food was plentiful, these people did not have to move far to search for it. They often settled in permanent villages for years at a time and so had a better opportunity than other peoples to develop planting and herding.

The First Farmers were people who depended chiefly on farming for food even though they hunted and gathered wild plants. Scientists believe the first farmers lived in what are now Israel and Jordan about 9000 B.C. and in southwestern Iran a few hundred years later. By 6500 B.C., agriculture had spread from the Middle East to the Greek Peninsula. Farming developed independently in what is now Thailand about 7000 B.C. and in central Mexico about 6500 B.C.

Farmers in different parts of the world raised different plants and animals. For example, people in Thailand cultivated bananas and breadfruit, and farmers in Iraq raised wheat. Other prehistoric crops included lentils, beans, squash, and yams. Early farmers also raised cattle, goats, pigs, and sheep.

Prehistoric farmers built larger settlements than did any Paleolithic peoples. They also put up sturdier homes than the simple shelters made by hunters. In southwestern Asia, for example, early farmers built their houses of sun-dried mud. In Europe, they built them of timber. Many farmers fenced their fields to keep their livestock in and wild animals out.

The Spread of Farming. Many prehistoric people became farmers because it made life easier in some ways. Mainly, it provided a steady supply of food in one place. This made it possible for a group to live in that place for several years. But in other ways, farming was more difficult than hunting. Early farmers often worked harder than hunters to obtain the same amount of food. As a result, many people remained hunters. But after the development of agriculture, more and more people became farmers.

Farmers set up a village near their cropland and lived there as long as the crops grew well. Most fields pro-



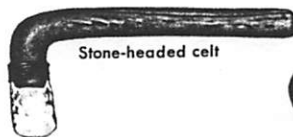
WORLD BOOK illustration by Alton S. Tobey; tools below by Alton S. Tobey and James Teason



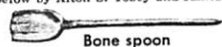
Stone mortar and pestle



Clay pot



Stone-headed celt



Bone spoon



Wooden sickle with flint cutting edge

New Stone Age People, also known as *Neolithic* people, were prehistoric farmers. From about 8000 B.C. to 3000 B.C., more and more people turned to farming instead of hunting for most of their food. One man above uses a sickle to harvest grain. A herder guards his flock of goats, and a hunter stands with a slain antelope over his shoulder. The women make pottery, spin, bake, and weave. Some tools and household items used by Neolithic peoples are shown above.

duced good crops for only a few years. The land became unproductive because continuous planting used up natural plant foods in the soil. The early farmers did not know about fertilizers that would replace these plant foods. They shifted their crops to new fields until none of the land near their village grew good crops. Then they moved to a new area and built another village. In this way, farmers settled many new areas.

Farm villages had spread throughout southwestern Asia and southeastern Europe by 6000 B.C. By about 5000 B.C., farmers had moved into the cool woodlands of central Europe. They lived throughout Europe, except for the dense northern forests, by 3000 B.C.

People in the Sahara highlands of northern Africa began to herd cattle and sheep by 6000 B.C. At that time, the Sahara had much more water and plant life than it has today. Herders there also hunted, fished, and grew grain. People who lived along the Nile River and the southern shore of the Mediterranean Sea began to farm about 5000 B.C.

Scientists know little about the spread of farming in Asia. But by 4000 B.C., people had begun to farm in the Indus River Valley of what is now Pakistan and in the Hwang Ho Valley of northern China.

In the Americas, farming began in most regions after prehistoric times. Although agriculture began to spread southward from Mexico about 5000 B.C., it did not reach most of South America until after 3000 B.C. Farm-

ing began in what is now the United States about 2500 B.C. Indians living north of Mexico apparently could find enough food as hunters and therefore did not begin farming so early as Indians living to the south. See **INDIAN, AMERICAN** (The First Americans).

Discoveries and Inventions. Farmers developed many new tools and used them to make their work easier. This use of discoveries and inventions—called *technology*—developed faster near the end of prehistoric times than ever before.

Early farmers used several tools invented between 15,000 B.C. and 9000 B.C., during the period of the first domestication. These tools included sickles to cut grain, grinding stones to grind grain into flour, and axlike implements called *celts*.

By about 7000 B.C., people had discovered how to make pottery. Before pottery was invented, people used animal skins or bark containers to hold water. To boil water, they had to drop red-hot stones into it, because they could not place animal skins or bark over a fire. With pottery containers, they could boil water and also store it more easily.

About the time people began to make pottery, they also used the stone *mortar* and *pestle*. The mortar was a shallow bowl, and the pestle was a small, clublike stone used to grind things against the bowl. Prehistoric farmers probably used the mortar and pestle to grind grain.

Shortly before 3000 B.C., farmers invented a wooden

plow that could be pulled by oxen. Farmers could turn over more soil with a plow than they could with hand tools. Plowing made farmland more fertile because it helped mix air and decayed plants into the soil. Plowing also brought deep layers of soil to the surface, which helped keep the land fertile longer. As a result, the plow greatly increased agricultural production.

Farmers in river valleys of the Middle East discovered how to irrigate their fields about 4500 B.C. Later, irrigation increased farm production in dry regions and even made agriculture possible in some desert areas. About 3000 B.C., the wheel was invented. The first wheels, made of wood, led to the invention of carts, wagons, and war chariots.

No one knows when people made the first objects out of metal. But metals became important only after metalworkers learned to make bronze, a metal hard enough to use in tools and weapons. Some people made bronze as early as 3500 B.C. By about 3000 B.C., bronze had replaced stone as the most useful material. The Stone Age then ended, and the Bronze Age began. People first smelted iron ore about 3000 B.C. But the use of iron did not become widespread until between 1500 and 1000 B.C. See **BRONZE AGE; IRON AGE**.

The First Cities. As prehistoric people became better farmers, they began to produce enough food to support villages with more and more people. By about 3500 B.C., some farm villages had developed into small cities. See **CITY** (How Cities Began and Developed).

Because of plentiful food supplies, many city dwellers were freed for jobs other than farming. As a result, some of them became craftworkers. They made pottery, tools, and other products. Other people became merchants and traders. Still others worked for the governments needed to help direct life in the cities.

City dwellers built bigger, sturdier homes than the shelters in villages. They also built large palaces, temples, and other buildings. For construction materials, they used mud bricks that had been dried in the sun or heated in ovens to make them hard and long lasting.

Scholars believe writing was invented shortly before 3000 B.C. in cities in the Tigris-Euphrates Valley in what is now Iraq. People then began to record their history, and prehistoric times came to an end.

How Prehistoric Human Beings Developed

Almost all scientists who study prehistoric human beings believe that they developed from humanlike apes that first lived more than 5 million years ago. But scientists have uncovered fossils of only several hundred prehistoric human beings. These fossils do not provide enough information to trace human development in detail. As a result, not all scientists agree on exactly how prehistoric human beings developed into modern people. This section presents the story of human development as most scientists believe it occurred.

Humanlike Ancestors. Scientists think that the first human beings developed from humanlike creatures called *australopithecines*. This name comes from the scientific term for this kind of creature—*Australopithecus* (southern ape). These humanlike apes first lived more than 5 million years ago. Almost all australopithecine fossils have been found in eastern and southern Africa.

Most experts believe there were two basic types of australopithecines. The two types differed chiefly in size. The smaller type stood about 4 feet (120 centimeters) tall. It probably weighed 100 to 120 pounds (45 to 54 kilograms) but may have weighed as little as 40 to 50 pounds (18 to 23 kilograms). The larger type stood about 5 feet (150 centimeters) tall and probably weighed 120 to 150 pounds (54 to 68 kilograms). Both types walked erect and had a brain about one-third the size of a modern human brain. The smaller australopithecines had strong, sharp front teeth much like those of present-day people. These teeth indicate that the smaller type probably ate much meat. The dull, grinding teeth of the larger type of australopithecine suggest that they probably ate mostly plants.

Many scientists believe that the smaller australopithecines developed into the first human beings and the larger type died out. But scientists do not know exactly how, when, or why these developments occurred.

Fossils of some smaller australopithecines indicate these humanlike apes looked more like human beings than did other australopithecines. Some scientists believe these creatures were the first members of the genus *Homo*, the genus of human beings. They call these creatures *Homo habilis*.

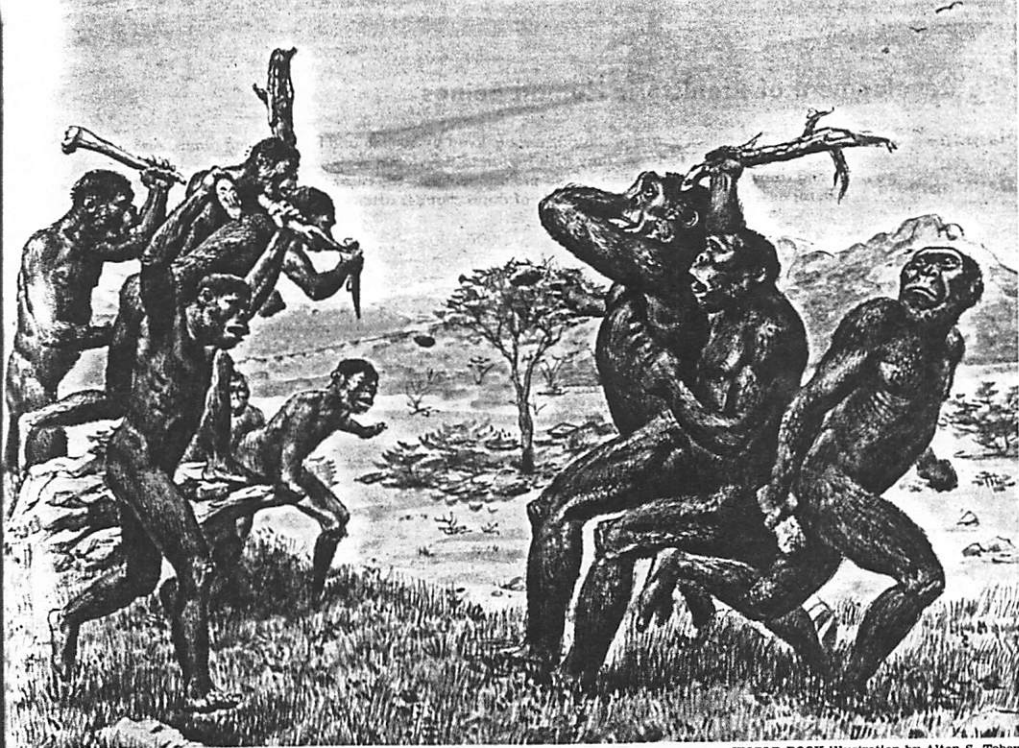
Since the mid-1960's, scientists have discovered many australopithecine fossils in eastern Africa. They have also found stone tools at campsites that date from about 2,000,000 B.C. These tools and other evidence indicate that some form of australopithecine—or perhaps *Homo habilis*—performed human activities at these sites. By *human activities*, scientists mean such practices as making and using tools, sharing food, and working together as a group. Only human beings perform all these activities. But scientists do not know exactly what kind of creature lived in the camp. See **AUSTRALOPITHECUS**.

Primitive Human Beings. By about 1,500,000 B.C., a form of early human being had appeared who was mentally and physically more advanced than the australopithecines. These people stood over 5 feet (150 centimeters) tall and had a large sloping forehead, a large chinless jaw, and a brain about twice the size of an australopithecine's. Scientists call this type of prehistoric human being *Homo erectus*.

Homo erectus lived in Africa, Asia, and Europe. These people used choppers, chopping tools, and hand axes. They learned to make fire and probably became the first people to wear clothing. The most important *Homo erectus* fossils have been found on Java; near Heidelberg, Germany; and near Peking, China (see **JAVA MAN; HEIDELBERG MAN; PEKING MAN**).

Homo sapiens followed *Homo erectus*. Scientists know little about how or when *Homo sapiens* replaced *Homo erectus*. The change occurred at different times in different parts of the world. An early form of *Homo sapiens* may have become the common type of people in Africa and Europe by about 300,000 B.C. and in eastern Asia by about 100,000 B.C.

The oldest known fossils of a type of *Homo sapiens* date from about 275,000 B.C. A group of these fossils has been found in Swanscombe, near London (see **SWANSCOMBE MAN**). This group consists of three pieces of a skull. A more complete skull of about the same age has



WORLD BOOK Illustration by Alton S. Tobey

The First Humanlike Creatures, known as *australopithecines* (southern apes), lived more than 5 million years ago. Scientists who study prehistoric people believe there were two types of *australopithecines*, differing chiefly in size. They believe the smaller type developed into the first human beings about 2½ million years ago. But they do not know exactly how this development occurred.

been found at Steinheim, in southern West Germany. The Steinheim and Swanscombe fossils come from individuals about the same size as *Homo erectus*. But the individuals had a larger brain than *Homo erectus*, and the shape of their skull was closer to that of a modern human skull.

The best-known example of early *Homo sapiens* is a group of people known as *Neanderthal man*. They lived in parts of Africa, Asia, and Europe from about 100,000 B.C. to about 35,000 B.C. Neanderthal men and women were heavily built and stood more than 5 feet (150 centimeters) tall. Their brains were as large as those of modern human beings. They fished and hunted birds and such large animals as bison and elephants. They also made flake tools. See NEANDERTHAL MAN.

Some peoples who lived before or during the time of Neanderthal people looked more like modern human beings than did the Neanderthals. Some of these peoples lived in Africa and southeastern Asia as early as 130,000 B.C. They had lighter builds, smaller faces, and longer arms and legs than the Neanderthals. Their fossils have been found in several places. Two fossils about 130,000 years old come from the Omo River Valley in southern Ethiopia. A group of fossils about 65,000 years old comes from Solo, Java (near Surakarta, Indonesia). A fossil of another more modern-looking individual, called *Rhodesian man*, has been found in southern Africa. Scientists once thought this fossil was linked to the Neanderthals, but now believe it to be much older.

Modern Human Beings developed by about 35,000 B.C. Many human fossils have been found dating from that time and later. All these fossils indicate that the people differed little from the various peoples of today. Scientists classify modern human beings as *Homo sapiens sapiens*, a subspecies of *Homo sapiens*.

The oldest known fossils of modern human beings were discovered at Border Cave, on the border between South Africa and Swaziland. They are at least 90,000 years old. The best-known early form of modern human being is Cro-Magnon man. The Cro-Magnons lived in northern Africa, western and central Asia, and Europe. They stood over 5½ feet (170 centimeters) tall and resembled present-day Scandinavians in build. Like Neanderthal man, they made flake tools, fished, and hunted birds and large game. See CRO-MAGNON MAN.

Learning About Prehistoric People

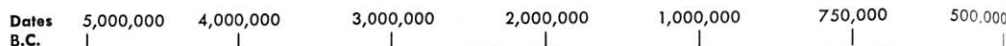
Scientists learn something about prehistoric people by studying isolated, nonindustrial peoples of today. For example, peoples on some islands of the South Pacific Ocean live much as their prehistoric ancestors did. But scientists gather most information about early people by studying fossils and other remains.

Many kinds of scientists work together to learn about prehistoric people. Archaeologists dig in the earth for fossils, tools, and other objects from prehistoric times. Botanists study the remains of prehistoric plants. Zoologists identify fossils of prehistoric animals. Earth scientists, such as geologists, study the layers of the earth

The Development of Prehistoric Human Beings

Human Cultural Development

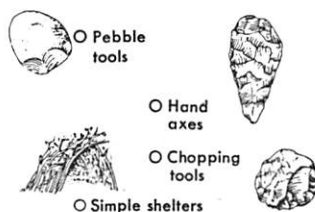
For about 2 1/2 million years, prehistoric people lived by hunting and by gathering plants. About 9000 B.C., people learned to farm. They then began to develop a way of life that led to the invention of writing about 3000 B.C. Writing ended prehistoric times. The chart below shows some steps in human cultural development. Note that the scale of dates changes after 1,000,000 B.C. and after 10,000 B.C.



Cultural Periods

Paleolithic Period
(Old Stone Age)

Elements of Culture



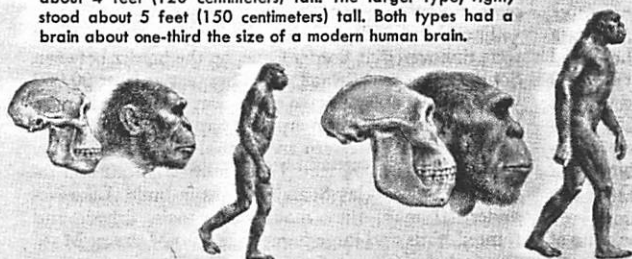
Human Physical Development

Scientists do not know exactly when or how the various species of human beings and their ancestors developed. For example, scientists have found evidence that the first human beings lived about 2,600,000 B.C. The chart at the right shows approximately when the various species of human beings and their ancestors lived. The drawings below show examples of these species and how their skulls, heads, and bodies probably looked. The maps indicate where fossils of these species have been found.



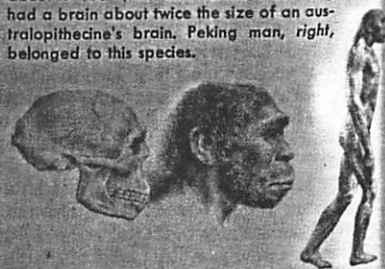
Humanlike Ancestors

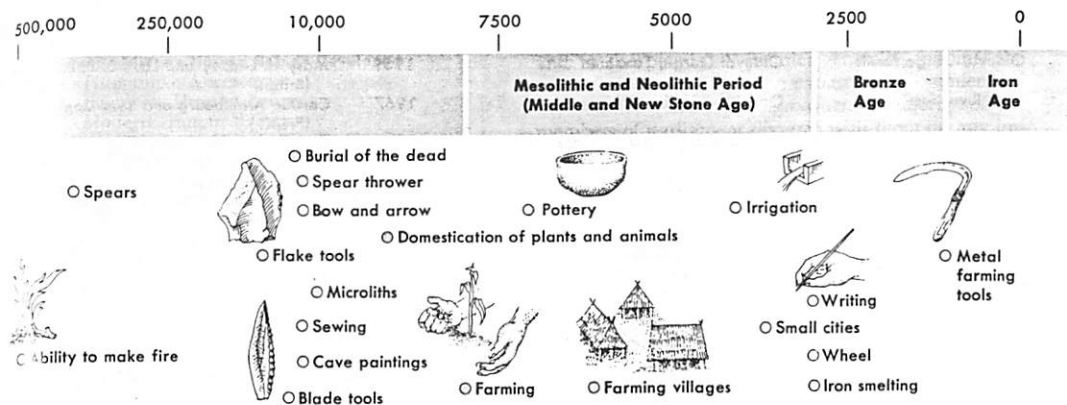
Scientists believe that human beings developed from the australopithecines. The smaller type of australopithecine, left, stood about 4 feet (120 centimeters) tall. The larger type, right, stood about 5 feet (150 centimeters) tall. Both types had a brain about one-third the size of a modern human brain.



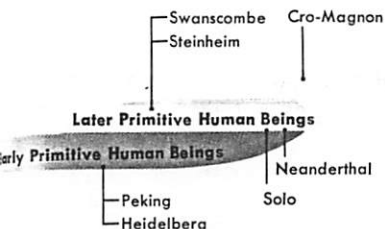
Early Primitive Human Beings

Members of the species *Homo erectus* stood about 5 feet (150 centimeters) tall. They had a brain about twice the size of an australopithecine's brain. Peking man, right, belonged to this species.





WORLD BOOK illustrations by Marion Pahl

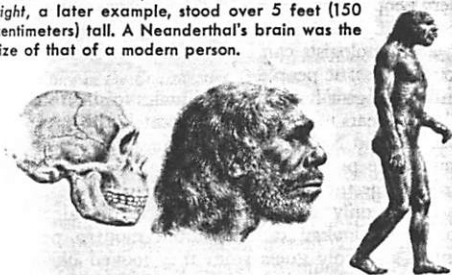


Modern Human Beings

WORLD BOOK illustrations by Rudolph Zallinger

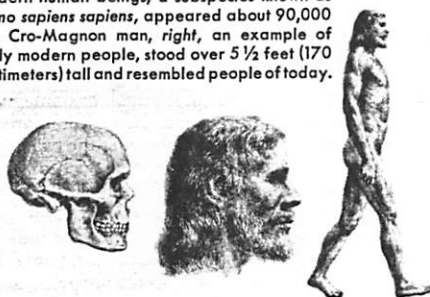
Later Primitive Human Beings

An early form of *Homo sapiens* may have become common about 300,000 B.C. Neanderthal man, right, a later example, stood over 5 feet (150 centimeters) tall. A Neanderthal's brain was the size of that of a modern person.



Modern Human Beings

Modern human beings, a subspecies known as *Homo sapiens sapiens*, appeared about 90,000 B.C. Cro-Magnon man, right, an example of early modern people, stood over 5½ feet (170 centimeters) tall and resembled people of today.



WORLD BOOK maps

Fossils of Prehistoric People

This table shows the date and place of discovery of some important fossils and the people who identified each one.

Fossil	Location	Year of Discovery	Identified By
Australopithecus			
Taung fossils	Taung, near Vryburg, South Africa	1924	Raymond A. Dart (Australian)
Sterkfontein Valley fossils	Sterkfontein, near Johannesburg, South Africa	1936	Robert Broom (British)
Olduvai Gorge fossils	Olduvai Gorge, Tanzania	1959	Mary N. Leakey and Louis S. B. Leakey (British)
Omo River fossils	Omo River Valley, Ethiopia	1967	Camille Arambourg and Yves Coppens (French)
Koobi Fora fossils	Lake Rudolf (now Lake Turkana), Kenya	1969	Richard E. Leakey (Kenyan)
Afar fossils	Awash River Valley, Ethiopia	1974	Maurice Talbot (French) and Donald C. Johanson (American)
Homo Erectus			
Java man	Trinil, near Surakarta, Indonesia	1891	Eugène F. T. Dubois (Dutch)
Heidelberg man	Mauer, near Heidelberg, West Germany	1907	Otto Schoetensack (German)
Peking man	Chou-k'ou-tien, near Peking, China	1927	Davidson Black (Canadian)
Homo Sapiens			
Neanderthal man	Neander Valley, near Düsseldorf, West Germany	1856	Johann C. Fuhlrott and Hermann Schaaffhausen (German)
Rhodesian man	Broken Hill, near Lusaka, Zambia	1921	Aleš Hrdlička (Bohemian-born American)
Solo man	Ngandong, near Surakarta, Indonesia	1931	C. ter Haar and W. F. F. Oppenorth (Dutch)
Steinheim man	Steinheim, near Stuttgart, West Germany	1933	Fritz Berckhemer (German)
Swanscombe man	Swanscombe, near London	1935	A. T. Marston (British)
Homo Sapiens Sapiens			
Cro-Magnon man	Les Eyzies, near Brive, France	1868	Louis Lartet (French)

in which fossils are found. All these scientists are also called *anthropologists* if their chief concern is the study of human beings and their way of life. For more information about these scientists and how they learn about prehistoric people, see **ANTHROPOLOGY**; **ARCHAEOLOGY**.

Searching for Clues. Scientists discover some objects from prehistoric times by searching places they believe to be archaeological sites. But most fossils are discovered by accident. For example, a farmer might turn up fossils while plowing a field.

Archaeological digging is a long, slow process. Workers must be careful not to overlook or damage fossils or other objects in the ground. In addition, archaeologists make detailed diagrams showing the exact location of each object uncovered at a site. Such diagrams help scientists determine the meaning of the objects they find. For example, the discovery of many stone flakes and unfinished tools in one area of a site indicates that the location was probably a toolmaking area. Pollen, other plant materials, and rock particles in the earth layers of the site provide information about past changes in the environment.

Studying the Evidence. After finding and recording the positions of prehistoric objects, the scientists ship them to a museum or university laboratory. There, the complete study of the objects may take several years.

Studying a fossil is especially difficult because a scientist must clean it before beginning the examination. A cementlike material covers many fossils, and it often takes months to remove this crust. The fossil is then studied in various ways. The scientist may X-ray it or examine thin parts of it under a microscope.

An important part of studying an archaeological object is determining its age. In most cases, geologists can

tell from which period of the earth's history an object dates by studying the ground where the object was found. Scientists use several other methods to determine more exact ages of objects. To learn about these methods, see **ARCHAEOLOGY** (Dating Materials).

Reconstructing Early Human Beings. Anthropologists determine the appearance of prehistoric people by comparing human fossils with the same skeletal parts of modern people. For instance, they can determine height by comparing the length of arm or leg bones. In this way, anthropologists can build models of skeletons of various prehistoric people.

Anthropologists have enough human fossils from the last 10,000 years to reconstruct accurately the figures of Mesolithic and Neolithic people. These people looked so much like present-day people that anthropologists can determine their appearance rather closely. But scientists have only a few hundred fossils of Paleolithic people, who looked different from modern people. Scientists can only guess what they looked like with flesh and hair added to the skeleton. As a result, different anthropologists often produce different models of the same prehistoric individual.

KARL W. BUTZER

Related Articles in WORLD BOOK include:

Anthropology	Kitchen Midden
Archaeology	Lake Dwelling
Australopithecus	Megalithic Monuments
Bronze Age	Neanderthal Man
Cave Dwellers	Peking Man
Cro-Magnon Man	Pitdown Man
Fossil	Pleistocene Epoch
Heidelberg Man	Prehistoric Animal
Indian, American	Stone Age
Iron Age	Swanscombe Man
Java Man	

Outline

- I. The World of Prehistoric People
- II. How Prehistoric Hunters Lived
 - A. Food
 - C. Tools
 - B. Clothing
 - D. Weapons
- III. How Prehistoric Farmers Lived
 - A. The First Steps to Farming
 - D. Discoveries and Inventions
 - B. The First Farmers
 - E. The First Cities
 - C. The Spread of Farming
- IV. How Prehistoric Human Beings Developed
 - A. Humanlike Ancestors
 - B. Primitive Human Beings
 - C. Modern Human Beings
- V. Learning About Prehistoric People
 - A. Searching for Clues
 - B. Studying the Evidence
 - C. Reconstructing Early Human Beings

Questions

- Why are people who lived more than 5,000 years ago called *prehistoric*?
- How did the two kinds of *australopithecines* differ?
- What is *domestication*?
- When did the first human beings live?
- What effect did the glacials have on where prehistoric people lived?
- How did prehistoric people make tools out of stone?
- Why did some prehistoric people become farmers?
- Why are fossils and stone tools important in the study of prehistoric people?
- How do scientists reconstruct what prehistoric people looked like?
- How did farming lead to the development of cities?

Books to Read

- BUTZER, KARL W. *Environment and Archeology: An Ecological Approach to Prehistory*. 2nd ed. Aldine, 1971.
- CLERMAM, C. W. *The First American: A Story of North American Archeology*. Harcourt, 1971.
- CHARD, CHESTER S. *Man in Prehistory*. 2nd ed. McGraw, 1975.
- COLLIER, JAMES L. *The Making of Man: The Story of Our Ancient Ancestors*. Scholastic Book Services, 1974. For young readers.
- KOENIGSWALD, GUSTAV H. R. VON. *The Evolution of Man*. Rev. ed. Univ. of Michigan Press, 1976.
- McGOWEN, TOM. *Album of Prehistoric Man*. Rand McNally, 1975. For young readers.
- PATON WALSH, GILLIAN. *The Island Sunrise: Prehistoric Culture in the British Isles*. Seabury, 1976.
- FEIFFER, JOHN E. *The Emergence of Man*. Harper, 1972.

PREJUDICE, *PREHJ uh dihs*, is a form of thinking in which people reach conclusions that are in conflict with the facts, because they prejudice conclusions. A person who is prejudiced against a certain group of people may dislike one particular member of that group even though there is no reason for this dislike. Prejudice can exist with respect to almost anything. It varies in intensity from moderate distortion to complete delusion.

Prejudices may be either favorable or unfavorable, but most persons use the word *prejudice* for negative judgments. The results of prejudice are often harmful. Psychologists and sociologists have devoted much study to the subject of prejudice, seeking ways to control, reduce, or prevent this form of thinking. If it could be controlled, people could make judgments only on the basis of facts.

JOHN F. CUBER

See also MINORITY GROUP; SEGREGATION.

PRELOG, VLADIMIR. See NOBEL PRIZES (table: Nobel Prizes for Chemistry—1975).

PREMIER, *prih MIHR*, or *PRE mee uhr*, is the head of the cabinet in France and various other countries

throughout the world. Such a leader is known as the *prime minister* in Great Britain and in other countries of the Commonwealth of Nations.

The premier is a member of the majority party, or one of the leading parties of the legislative body, or parliament. He or she is responsible to the parliament and to the people. A premier generally appoints the ministers who make up the cabinet. The premier and the cabinet generally resign when a majority of the members of parliament disagree with them on any important matter. A new premier is then appointed by the president or ruler of the country. The new premier is often one of the leaders of the party which opposed the old premier. Sometimes a premier may not resign when he or she is opposed, but may ask for a new parliamentary election instead. This election shows whether the people themselves agree with the premier's policies or those of the parliament. If the people support the premier, they elect a new parliament and the premier keeps the position of leader.

In Russia, the chairman of the Council of Ministers usually assumes the title of premier. The premier is the head of the government, and has dictatorial powers.

In Canada, a premier heads the government in nine provinces, and Quebec has a prime minister. Each premier or prime minister is the leader of the majority party in the provincial legislature and presides over a cabinet.

The United States government has no premier. The President serves as head of the Cabinet. PAYSON S. WILD See also CABINET; PARLIAMENT.

PREMIUM. See INSURANCE (How Insurance Works).

PREMYSLIDE FAMILY. See CZECHOSLOVAKIA (Rise of Bohemia).

PRENDERGAST, MAURICE BRAZIL (1859-1924), was an American painter and illustrator. His paintings capture the life and movement of crowds in city parks and at the seaside. His paintings show his familiarity with European postimpressionist experiments in the handling of form, color, and light.

Prendergast was born in St. John's, Nfld., and grew up in Boston. He was attracted by Robert Henri's philosophy of independent and spontaneous expression in art. In 1908, he joined Henri's group of realistic painters called *The Eight* (later the *Ashecan School*). For more information on the group, see HENRI, ROBERT. In 1913, Prendergast exhibited in the famous Armory Show of modern art in New York City. F. MAURICE BLOCH

PREPARATORY SCHOOL, in the United States, is a private secondary school that prepares students for college. In Great Britain, a preparatory school corresponds to a private elementary school in the United States. It prepares students for the so-called public schools, such as Eton and Harrow.

In the United States, public secondary education expanded slowly until the 1890's and 1900's. Private secondary schools called *academies* remained popular until the mid-1800's. But as the public high school increased its scope, the number of academies declined. Many academies became preparatory schools. The older preparatory schools are usually boarding schools (see BOARDING SCHOOL). Those preparatory schools established more recently usually serve students who live at